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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/829,451	04/22/2004	Robert Harold Bateman	DEH073	6327
7590 08/13/2004 DIEDERIKS & WHITELAW, PLC 12471 Dillingham Square, #301 Woodbridge, VA 22192			EXAMINER VANORE, DAVID A	
			ART UNIT	PAPER NUMBER
			2881	

DATE MAILED: 08/13/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/829,451	BATEMAN ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	David A Vanore	2881	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 22,23,25-31 and 38-46 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 22,23,25-31,38,39,41,42,44 and 45 is/are rejected.
- 7) ☒ Claim(s) 40,43 and 46 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☒ Certified copies of the priority documents have been received in Application No. 10/178,854.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |  |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>4/22/04</u> | 6) <input type="checkbox"/> Other: ____  |

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this

Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 23, 25-31, 41, 42, 44 and 45 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Kirchner.

Kirchner teaches a mass spectrometer comprising an ion trap teaching the elements as related to the following claims:

23. A mass spectrometer comprising:

- an ion tunnel ion trap (Item 26 Fig. 3) comprising at least three segments (Fig. 17A Segments A, B, and C),
  - each segment comprising at least four electrodes (Note Col. 28 Lines 8-40) having substantially similar sized apertures through which ions are transmitted in use;
  - wherein in a mode of operation: electrodes in a first segment are maintained at substantially the same first DC potential but adjacent electrodes are supplied with different phases of an AC or RF voltage supply; electrodes in a second segment are maintained at substantially the same second DC potential but adjacent electrodes are supplied with different phases of an AC or RF voltage supply; electrodes in a third segment are maintained at substantially the same third DC potential but adjacent electrodes are supplied with different phases of an AC or RF voltage supply; wherein said first, second and third DC potentials are all different.
- Regarding the final "wherein" limitation in claim 23, Kirchner teaches that a DC offset is applied to the electrodes and further that the offset is varied in predefined regions of the trap which Kirchner

describes as a local offset (Col. 18 Lines 26-51 and Col. 23) where the DC potential is varied locally over differing regions of the trap. Turning again to Fig. 17A-D and Fig. 18, Kirchner depicts three segments of electrodes where DC and AC or RF potentials are varied controllably such that the potentials may be the same or different in the three segments as governed by the potential map generation equations on Col. 17-18 to control the shape of the DC and RF potential wells to control movement of ions within the trap. The limitation is also similarly recited in claims 39, 42, and 45 where the cited teaching applies.

25. A mass spectrometer comprising:

- an ion tunnel ion trap (26)
- said ion tunnel ion trap comprising a plurality of electrodes (Fig. 3 and Item 22) having apertures through which ions are transmitted in use
- wherein in a mode of operation trapping DC voltages (Col. 18 Lines 41-51) are supplied to some of said electrodes so that ions are confined in two or more axial DC potential wells, where the two or more wells are depicted in Fig. 12 D for example.

26. A mass spectrometer comprising:

- an ion tunnel ion trap (26) comprising a plurality of electrodes (Fig. 3 and Item 22) having apertures through which ions are transmitted in use
- wherein in a mode of operation a V-shaped, W-shaped, U-shaped, sinusoidal, curved, stepped or linear axial DC potential profile is maintained along at least a portion of said ion tunnel ion trap (Note the shape of the potential wells depicted in Figs. 4 and 6-11).

27. A mass spectrometer comprising:

- an ion tunnel ion trap (26) comprising a plurality of electrodes (22) having apertures through which ions are transmitted in use,
- wherein in a mode of operation an upstream portion of the ion tunnel ion trap continues to receive ions into the ion tunnel ion trap whilst a downstream portion of the ion tunnel ion trap separated from the upstream portion by a potential barrier stores and periodically releases ions.
- Kirchner teaches the controlled release of ions from one region into another region where the first region maintains a reservoir of ions and periodically releases them upstream (Note Col. 9 Lines 55-61 and Col. 10 Line 56 to Col. 11 Line 6 where Kirchner teaches that a portion of the sample is separated and translated to another portion of the trap).

28 and 29. A mass spectrometer as claimed in claim 27:

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- wherein said upstream portion of the ion tunnel ion trap has a length which is at least 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, or 90% of the total length of the ion tunnel ion trap.

Regarding this limitation, Fig. 17A for instance shows the separation of a packet of ions from a downstream portion to an upstream portion where the downstream and upstream portion are greater than 10% of the length of the trap depicted.

30. A mass spectrometer as claimed in claim 27,
- wherein the downstream portion of the ion tunnel ion trap is shorter than the upstream portion of the ion tunnel ion trap. Fig. 18 of Kirchner depicts an upstream portion larger than a down stream portion.
- 31, 41, and 44. A mass spectrometer as claimed in claim 27,
- wherein ions are substantially not fragmented within said ion tunnel ion trap. Kirchner at Col. 24 Line 46 to Col. 26 Line 9 describes a regime for non-collisional cooling. Fragmentation of the ions requires collision with either each other or a background gas. In the regime described by Kirchner, there are no collisions and hence no fragmentation.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 22, 38, and 39 rejected under 35 U.S.C. 103(a) as being unpatentable over Kirchner.

Kirchner teaches an ion processing unit in a mass spectrometer comprising an ion trap (Fig. 3) comprising 10 or more ring electrodes (Item 22), each set of ring electrodes (26) forming an ion channel in the trapping element (10) depicted in Fig. 2; where a DC potential is applied to the electrodes, termed

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a DC offset in Kirchner (Col. 23 Lines 25-56), along a portion of the trap where two or more axial potential wells are formed along the length of the trap (Note Fig. 4) where there is no substantial fragmentation of ions within the trap as described in relation to claim 31 and recited in claim 38. Note further the teaching from Kirchner cited in regards to claim 23 where the limitations of claim 39 are discussed.

Kirchner fails to teach that the electrodes have an internal aperture diameter of 2-10 mm.

Kirchner teaches that the ring electrodes have an aperture diameter of about 2 cm or 20 mm.

It is not apparent in the disclosure of the instant application or in Kirchner that a change in the aperture size from 10 mm to 20 mm is critical to the practice of the invention.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to, absent any teaching of the criticality of the size of the electrode apertures, reduce the aperture diameter of the ring electrodes present in Kirchner to 2-10 mm from 20 mm to increase the number of ion channels in the ion trap of Kirchner and allow more ion to be processed within the trap (10) while maintaining the current size of the trap.

#### ***Allowable Subject Matter***

Claims 40, 43, and 46 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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The following is a statement of reasons for the indication of allowable subject matter: After searching for the limitation recited in claims 40, 43, and 46 reciting the introduction of a gas and cooling ions without fragmentation, the examiner cites USPN 6,504,150 B1 (Verentchikov et al.) which at Col. 9 discloses the introduction of a gas into an ion trap and the cooling of ions without fragmentation. However, there is no apparent motivation to combine the references. While the Verentchikov et al. reference recites the capability to carry out the recited limitation, the mere capability to perform the function does not qualify as an adequate motivation to combine the reference with the prior art.

### ***Conclusion***


Any inquiry concerning this communication or earlier communications from the examiner should be directed to David A Vanore whose telephone number is (571) 272-2483. The examiner can normally be reached on M-F 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R. Lee can be reached on (571) 272-2477. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

dav

  
**NIKITA WELLS**  
**PRIMARY EXAMINER** 08/11/08